Snow Coverage Area for the Sierra Nevada –May 1, 2008

The following analysis of **S**now **C**overed **A**rea (SCA) is derived from MODIS (Moderate Resolution Imaging Spectroradiometer) aboard NASA's Terra and Aqua satellites. Data from MODIS are processed to provide a resolution of 500 meters and a fractional SCA product where each pixel can range in value between 0 and 100% (e.g. 50%=50% of the 500 meter pixel is covered by snow) as opposed to the operational binary product that defines a pixel as either snow or snow free. The MODIS SCA product is available on a daily basis, but viewable areas are subject to cloud cover. In addition, tree canopies mask a portion of the SCA and should be viewed accordingly based on the vegetation characteristics of each hydrologic unit and watershed.

This analysis covers the Sierra Nevada and various river basins, with Figure 1 highlighting the SCA over the Sierra Nevada for May 1, 2008, and Figure 2 showing the daily SCA in select river basins for April 2007 and 2008. Figures 3 (a-e) focuses on the **Feather**, **American, Tuolumne, Merced, and Kaweah** River basins. The years 2007 and 2005 are used to represent the extreme variability that the Sierra's have experienced and provide a current benchmark for comparison. Additional basins will be added throughout the year and upon request.

These data and analysis are made available by the University of California, Merced and University of California, Santa Barbara under *NASA Grant NNG04GC52 (REASoN CAN 'Multi-resolution snow products for the hydrologic sciences')* and *California Department of Water Resources Agreement 4600007954.*

For further information or comments/suggestions please contact Robert Rice (rrice@ucmerced.edu or (209)228-4397).

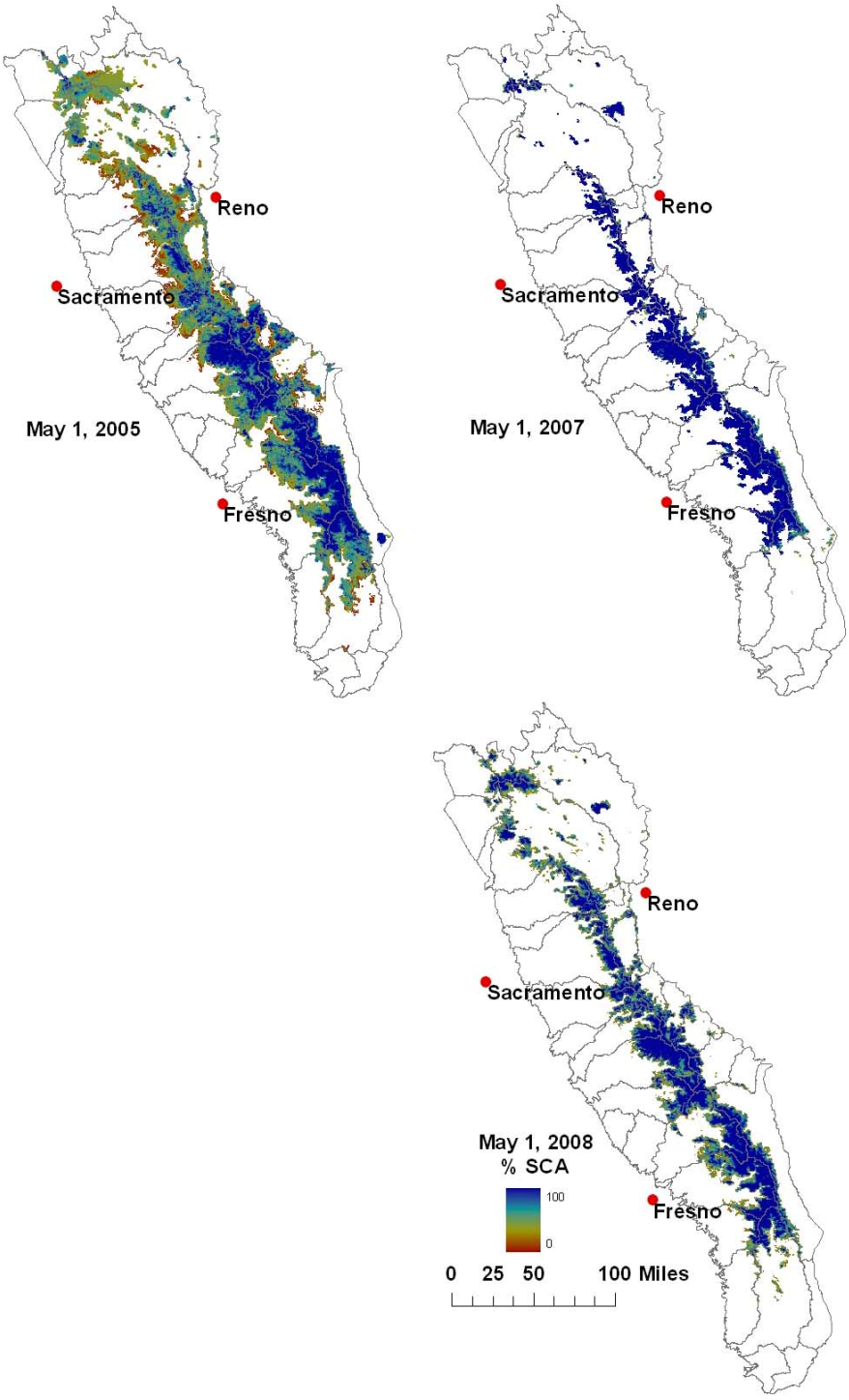


Figure 1. SCA over the **Sierra Nevada** on May 1, 2007/2005 and May 1, 2008 outlined by the individual watersheds. Evident is the extent of snowcover between May 2008 and 2007 in which the statewide snow water equivalent (SWE) on May 1, 2008 was 51% of the historical April 1 average, while the May 1, 2007 was 20% of the April 1 average. On May 1, 2005 the Sierra Nevada was 118% of the April 1 average.

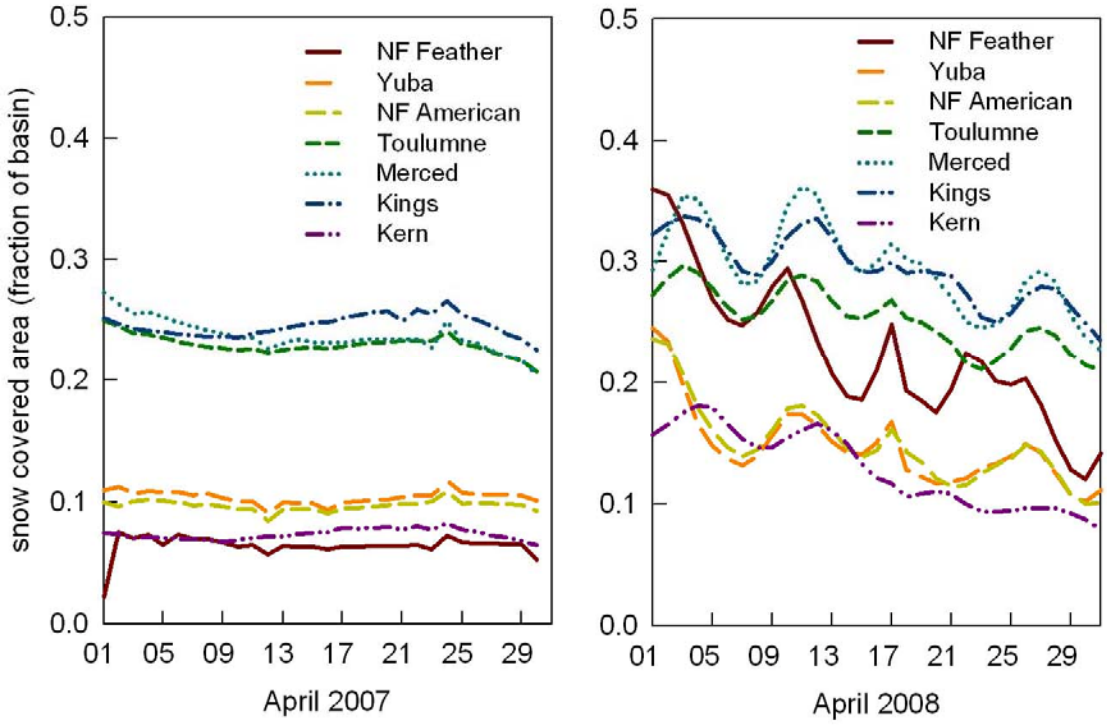
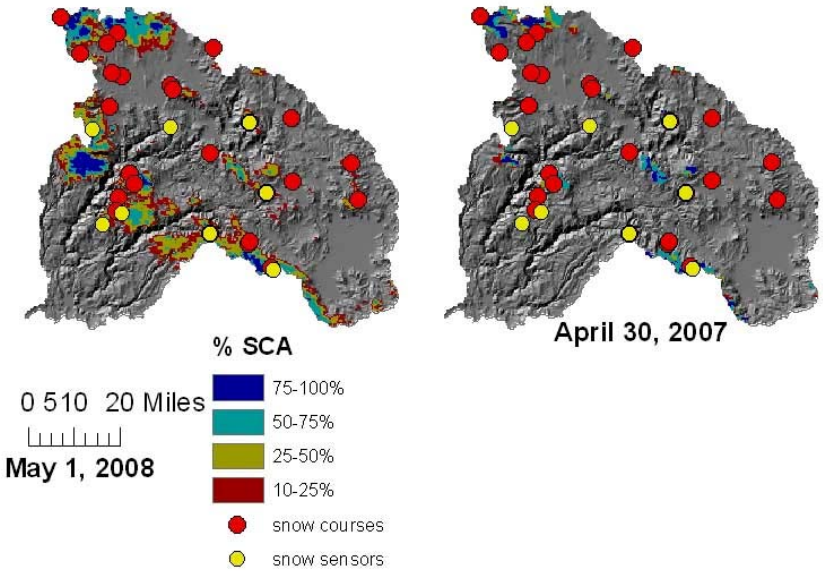
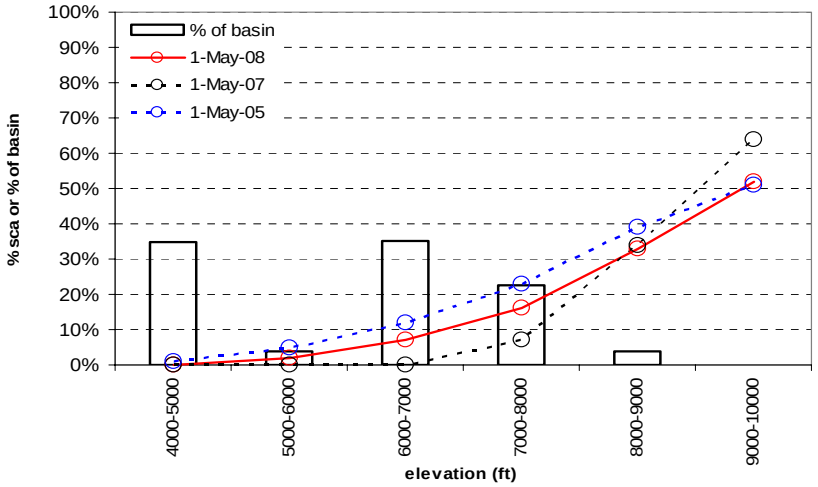


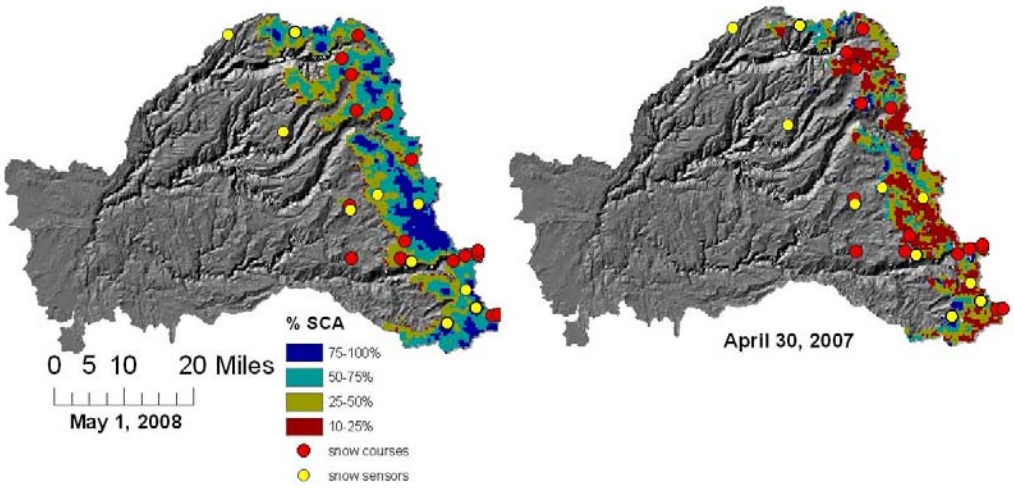
Figure 2. The graphs show the daily April 2007 and 2008 progression of SCA, expressed as a fraction of the basin area (e.g. 0.25 = 25%) in the Sierra Nevada (above the Central Valley) and shows significant differences between the April 2007 and 2008 snow covered area in 7 river basins.

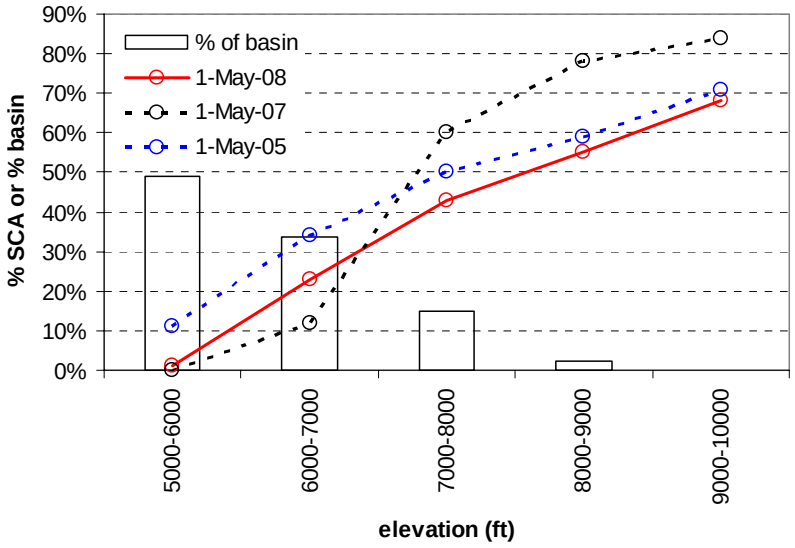




	May 1, 2008	May 1, 2007	May 1, 2005
4000-5000	0%	0	1%
5000-6000	2%	0%	5%
6000-7000	7%	0%	12%
7000-8000	16%	7%	23%
8000-9000	33%	34%	39%
9000-10000	52%	64%	51%

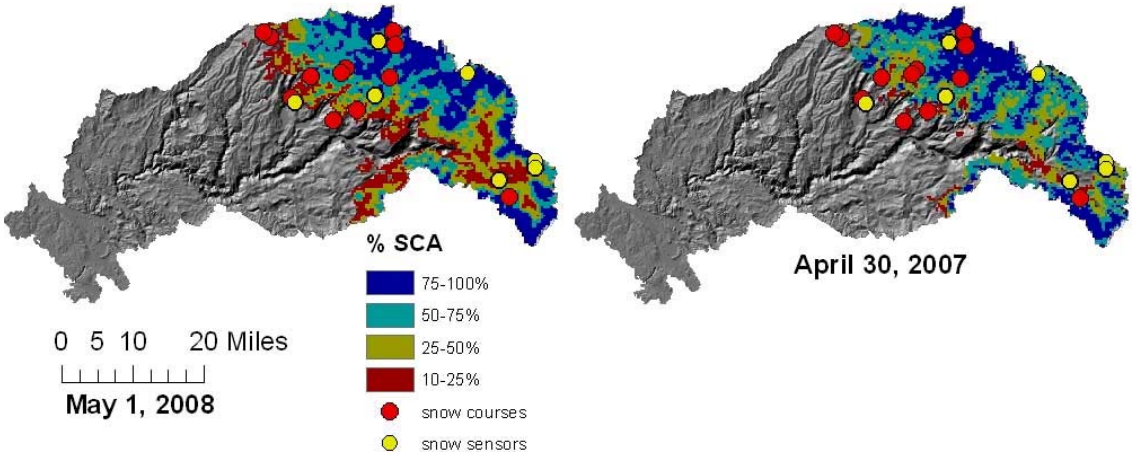
Figure 3(a). SCA over the **Feather River** Basin on May 1, 2008 and April 30, 2007. On May 1, 2008 basin-wide SWE was 48% of the April 1 historical average (based on basin-wide snow course data), while May 1, 2007 was 20% of the April 1 average. On May 1, 2005 basin-wide SWE was 81% of the April 1 historical average. Graphical and tabular data represent average % SCA by 1000 foot elevation bands over the **Feather River** Basin for May 1, 2008 and May 1, 2007/2005.

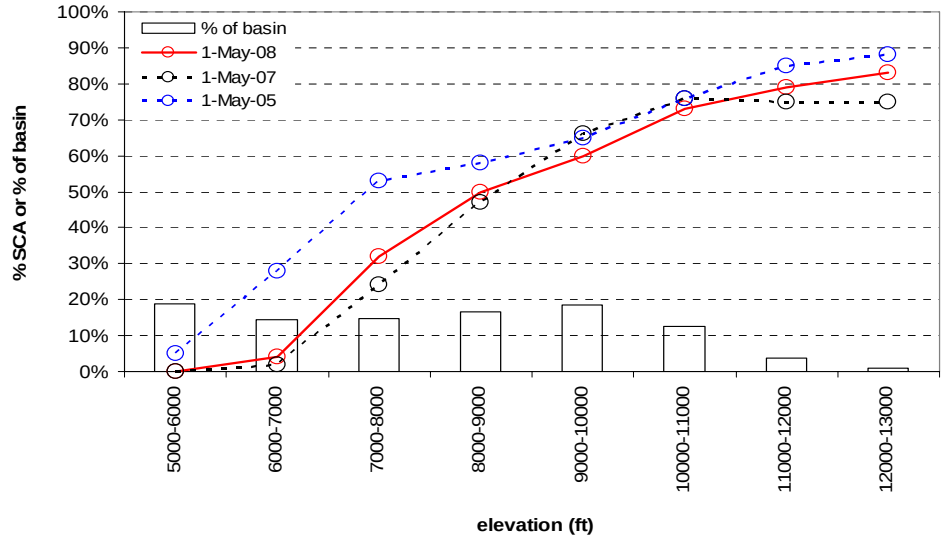




	May 1, 2008	May 1, 2007	May 1, 2005
5000-6000	1%	0%	11%
6000-7000	23%	12%	34%
7000-8000	43%	60%	50%
8000-9000	55%	78%	59%
9000-10000	68%	84%	71%

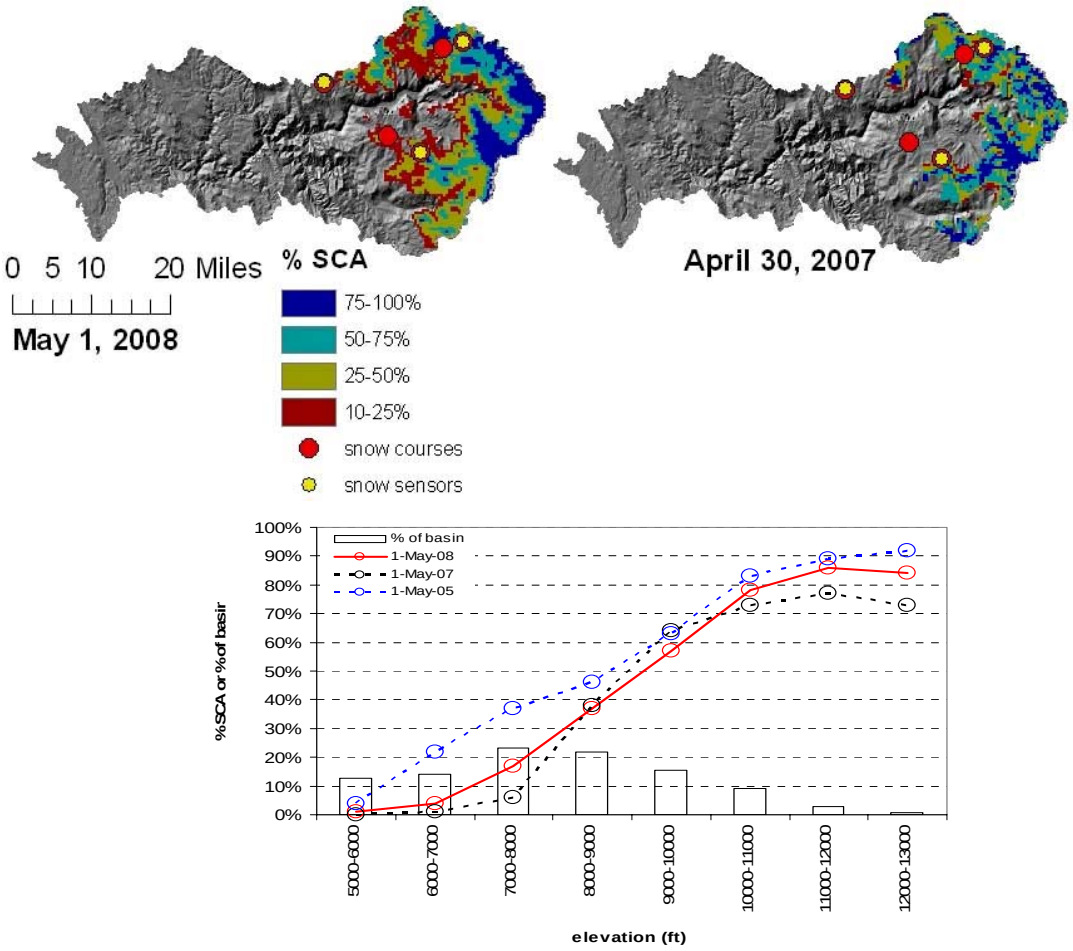
Figure 3(b). SCA over the **American River** Basin on May 1, 2008 and April 30, 2007. On May 1, 2008 basin-wide SWE was 36% of the April 1 historical average (based on basin-wide snow course data), while May 1, 2007 was 14% of the April 1 average. On May 1, 2005 basin-wide SWE was 108% of the April 1 historical average. Graphical and tabular data represent average % SCA by 1000 foot elevation bands over the **American River** Basin for May 1, 2008 and May 1, 2007/2005.





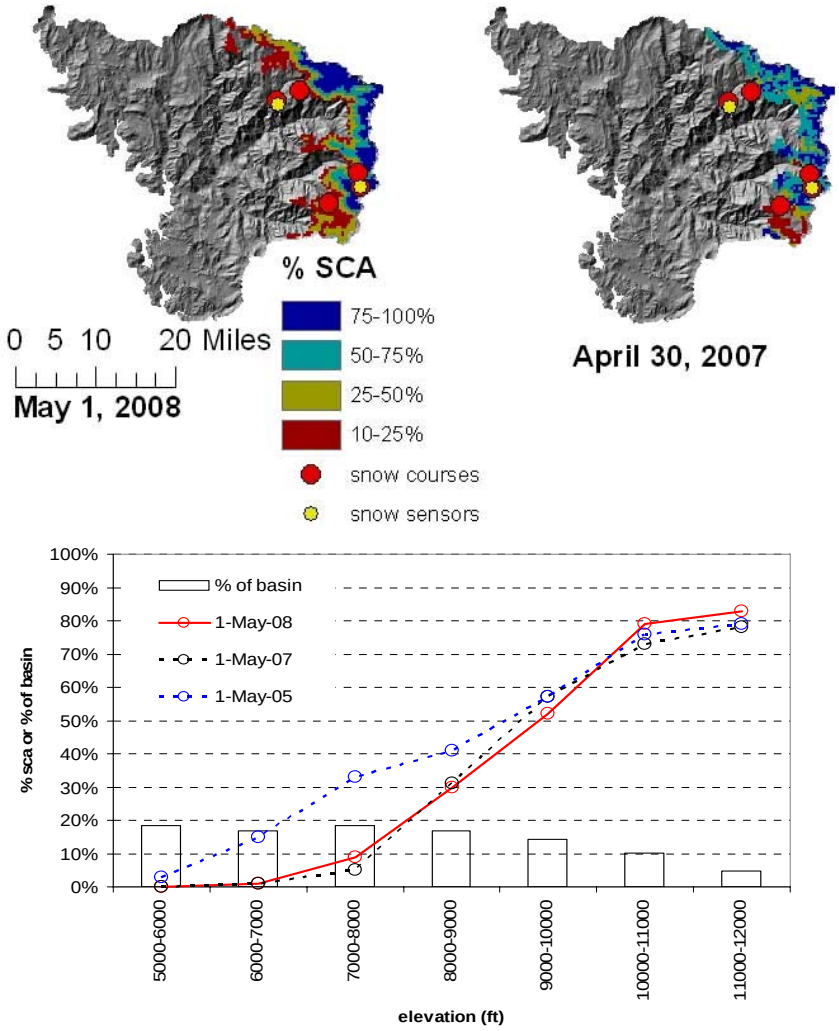
	May 1, 2008	May 1, 2007	May 1, 2005
5000-6000	0%	0%	5%
6000-7000	4%	2%	28%
7000-8000	32%	24%	53%
8000-9000	50%	47%	58%
9000-10000	60%	66%	65%
10000-11000	73%	76%	76%
11000-12000	79%	75%	85%
12000-13000	83%	75%	88%

Figure 3(c). SCA over the **Tuolumne River** Basin on May 1, 2008 and April 30, 2007. On May 1, 2008 basin-wide SWE was 52% of the April 1 historical average (based on basin-wide snow course data), while May 1, 2007 was 24% of the April 1 average. On May 1, 2005 basin-wide SWE was 146% of the April 1 historical average. Graphical and tabular data represent average % SCA by 1000 foot elevation bands over the **Tuolumne River** Basin for May 1, 2008 and May 1, 2007/2005.



	May 1, 2008	May 1, 2007	May 1, 2005
5000-6000	1%	0%	4%
6000-7000	4%	1%	22%
7000-8000	17%	6%	37%
8000-9000	37%	38%	46%
9000-10000	57%	64%	63%
10000-11000	78%	73%	83%
11000-12000	86%	77%	89%
12000-13000	84%	73%	92%

Figure 3(d). SCA over the **Merced River** Basin on May 1, 2008 and April 30, 2007. On May 1, 2008 basin-wide SWE was 71% of the April 1 historical average (based on basin-wide snow course data), while May 1, 2007 was 23% of the April 1 average. On May 1, 2005 basin-wide SWE was 158% of the April 1 historical average. Graphical and tabular data represent average % SCA by 1000 foot elevation bands over the **Merced River** Basin for May 1, 2008 and May 1, 2007/2005.



	May 1, 2008	May 1, 2007	May 1, 2005
5000-6000	0%	0%	3%
6000-7000	1%	1%	15%
7000-8000	9%	5%	33%
8000-9000	30%	31%	41%
9000-10000	52%	57%	57%
10000-11000	79%	73%	76%
11000-12000	83%	78%	79%

Figure 3(e). SCA over the **Kaweah River** Basin on May 1, 2008 and April 30, 2007. On May 1, 2008 basin-wide SWE was 71% of the April 1 historical average (based on basin-wide snow course data), while May 1, 2007 was 19% of the April 1 average. On May 1, 2005 basin-wide SWE was 129% of the April 1 historical average. Graphical and tabular data represent average % SCA by 1000 foot elevation bands over the **Kaweah River** Basin for May 1, 2008 and May 1, 2007/2005.